

NEMATODES OF ALFALFA (*MEDICAGO SATIVA* L.).
III. ROOT-LESION NEMATODES.

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Root-lesion nematodes are found worldwide in temperate and tropical habitats. They attack a wide range of plants both cultivated and noncultivated, including alfalfa. Root-lesion nematodes have been reported to reduce foliage yields of alfalfa and other forage legumes in the Maritime Provinces of Canada (4,8) where they occur abundantly. In Kentucky it was reported (1) that alfalfa planted in the spring, following small grain crops, resulted in poor stands which often had to be plowed out. Lesion nematodes were found in high numbers in the alfalfa roots. To overcome this problem, growers began planting alfalfa in the fall, usually after a period of summer fallow.

Seven species of root-lesion nematodes, *Pratylenchus*, have been reported associated with alfalfa, but *Pratylenchus penetrans* (Cobb, 1917) Filipjev and Schuurmans Stekhoven, 1941 is the most important. Other species include *P. crenatus* Loof, 1960, *P. neglectus* (Rensch, 1924) Filipjev and Schuurmans Stekhoven, 1941, *P. coffeae* (Zimmerman, 1898) Filipjev and Schuurmans Stekhoven, 1941, *P. pratensis* (de Man, 1880) Filipjev, 1936, *P. vulnus* Allen and Jensen, 1951, and *P. globulicola* Romaniko, 1960 (7).

Root-lesion nematodes are migratory endoparasites which penetrate and move in the root system. They damage and destroy plant cells, primarily the epidermis and cortical parenchyma (Fig. 1) during migration and feeding. Studies have shown that control of root-lesion nematodes, especially *P. penetrans* in seedling alfalfa has resulted in increased yields the first year. These nematodes are reported to decrease cold tolerance (Fig. 2) of their hosts and increase infections by *Fusarium* spp. (2,7).

High numbers of nematodes on alfalfa plants cause some reduction in growth. However, this damage is difficult to assess since there are not always readily apparent symptoms on the above ground portion of the plant. In roots, necrotic lesions (Fig. 3) and the occurrence of a yellow-green fluorescent compound in the central area of the tap root is a consistent response (3)

Disease Cycle

Pratylenchus adult females lay eggs in infected root tissue or in the soil. Juvenile and adult nematodes enter roots by penetrating between and through cortical cells. Lesions, which become discolored, are formed at the point of nematode penetration on the root. Due to accumulation of secondary organisms, lesions usually turn to various shades of brown to black and several may coalesce to give roots an overall diseased appearance (Fig. 3). Heavy

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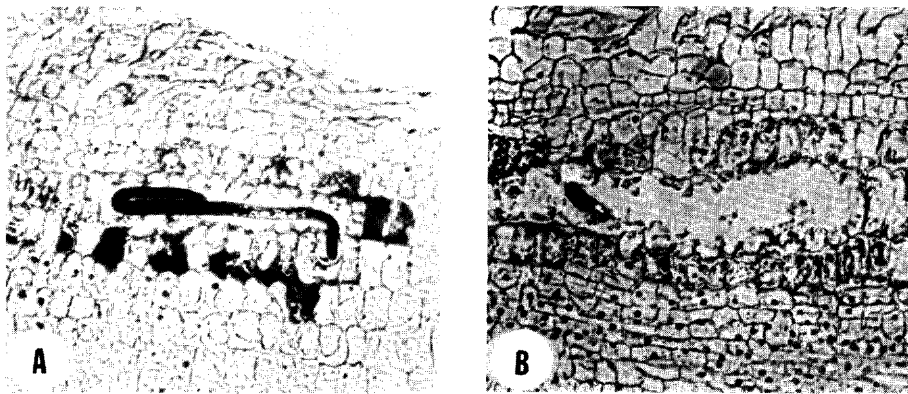


Fig. 1. A. Longitudinal section of an alfalfa root showing an adult female *P. penetrans* (dark stained) invading the cortex of an alfalfa root. B. Longitudinal section showing a cavity formed by *P. penetrans* in the cortical parenchyma of an alfalfa root. (Courtesy J. L. Townshend and L. Stobbs)



Fig. 2. Regrowth after cold treatment. Alfalfa plants on left are nematode infested; on right noninfested plants. (Courtesy Michio Suzuki and C. B. Willis).



Fig. 3. Typical root lesions (arrows) on 3-4 year old alfalfa caused by *Pratylenchus penetrans*. Lesions may result from multiple or single infections and vary in size and shape. (Courtesy L. S. Thompson and C. B. Willis)

infestations cause a reduction in root development and can reduce forage yields. Root penetration by the nematode can occur at temperatures from 5 to 35 C with maximum frequency of penetration between 10 and 30 C. The life cycle generally will be completed in 28-30 days, but environmental factors may accelerate or retard development (5).

Management Considerations

Alfalfa cultivars resistant to root-lesion nematodes are not presently available and little is known concerning the long term performance of cultivars among *Medicago* species. However, recent studies indicate that it may be possible to develop adapted cultivars with satisfactory resistance to one or more *Pratylenchus* species (7).

Preplant chemical treatments may be of value in controlling root-lesion nematodes in alfalfa if it is known this nematode has been a problem in the previous crop. However, chemical treatment for control of this nematode on alfalfa may not be economical.

Where practical, fallow offers the best practice for reducing populations below damaging levels for stand development.

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